

Applicant: Sakari Soini  
PCT App. No.: PCT/FI00/00843

In the Claims:

Please cancel claims ~~1-10~~ and add the following new claims.

11. A method for generating and maintaining turbulence in a stock suspension flow which is conducted through a turbulence generator into a slice duct of a headbox and therefrom, through a slice opening to a web former, in which procedure the stock suspension flow is distributed into a number of superimposed layers with the aid of turbulence pipes, whereafter an impact of elements generating and maintaining turbulence is directed thereto, wherein the turbulence is generated in different layers of the flow in different phases of the flow by arranging the elements generating and maintaining turbulence at different distances from the slice opening of the headbox, whereby, at the slice opening, a different turbulence prevails in different layers of the stock suspension flow.

A 12. The method of claim 11, wherein the elements generating and maintaining turbulence comprise stepped expansions of the flow cross-section area of the turbulence pipes, the stepped expansions being positioned in superimposed rows of the turbulence pipes at different distances from the slice opening of the headbox.

13. The method of claim 11 wherein the turbulence pipes have outlet ends through which the stock suspension flow passes into the slice duct, and wherein the elements generating and maintaining turbulence comprise trailing elements on the outlet ends of the turbulence pipes, the trailing elements extending to the slice duct of the headbox, wherein each trailing element has a tip, and wherein the distance of the tips from the slice opening of the headbox is arranged to be different between the superimposed flow layers.

Applicant: Sakari Soini  
PCT App. No.: PCT/FI00/00843

14. The method of claim 11 wherein in the dimensioning of the elements generating and maintaining turbulence, the structure of the web former subsequent to the headbox is taken into account in that in the layers of the stock suspension flow being filtered last in the web former, said elements are positioned closer to the slice opening of the headbox than in the layers of the stock suspension flow which will be filtered first.

15. A turbulence generator for the headbox of a paper machine, the headbox having a width, the turbulence generator comprising:

A<sup>1</sup>  
a plurality of superimposed turbulence pipes arranged in rows extending across the entire width of the headbox, through which a stock suspension flow to be conducted from the headbox to a web former is arranged to flow; and portions of each turbulence pipe which define a stepped expansion of the flow cross-section area in the space between an inlet end and an outlet end of each pipe, the stepped expansion of each turbulence pipe being positioned at an expansion spot, wherein in superimposed pipe rows, the distance of the expansion spot of the turbulence pipes from the slice opening of the headbox in association with the pipe rows, is different in that at the slice opening a different turbulence prevails in different layers of the stock suspension flow.

16. The turbulence generator of claim 15, further comprising:  
a plurality of trailing elements connected to the turbulence generator, starting from between the pipe rows and extending towards the slice duct of the headbox, each trailing element having a tip at its downstream end; and wherein in superimposed pipe rows, the distance of the tips of the trailing elements from the slice opening of the headbox in association with the pipe rows, is different in that at the slice opening a different turbulence prevails in different layers of the stock suspension flow.

Applicant: Sakari Soini  
PCT App. No.: PCT/FI00/00843

Fig 1  
Fig 5  
17. The turbulence generator of claim 15, wherein the superimposed rows of turbulence pipes include a centermost row of pipes, and wherein the expansion spots of the pipes within a row are positioned closer to the slice opening of the headbox, the closer said pipe row is to the centermost pipe row.

Fig 2  
18. The turbulence generator of claim 15, wherein the superimposed rows of turbulence pipes include a lowermost row of pipes, and wherein the expansion spots in a row are closer to the slice opening of the headbox, the farther said pipe row is from the lowermost pipe row of the turbulence generator.

19. A paper machine headbox turbulence generator for the headbox of a paper machine, the headbox having a width, the turbulence generator comprising:

A1  
a plurality of superimposed turbulence pipes arranged in rows extending across the entire width of the headbox, through which a stock suspension flow to be conducted from the headbox to a web former is arranged to flow; and

a plurality of trailing elements connected to the turbulence generator, starting from between the pipe rows and extending towards the slice duct of the headbox, each trailing element having a tip at its downstream end; and

Fig 3  
portions of each turbulence pipe which define a stepped expansion of the flow cross-section area in the space between an inlet end and an outlet end of each pipe, the stepped expansion of each turbulence pipe being positioned at an expansion spot, wherein in superimposed pipe rows, the distance of the tips of the trailing elements from the slice opening of the headbox in association with the pipe rows, is different in that at the slice opening a different turbulence prevails in different layers of the stock suspension flow.

20. The turbulence generator of claim 19, wherein the turbulence pipes of superimposed pipe rows have different flow cross-section areas.

Applicant: Sakari Soini  
PCT App. No.: PCT/FI00/00843

21. The turbulence generator of claim 20, wherein the flow cross-section areas of the turbulence pipes of one of the superimposed pipe rows are greater, the closer said pipe row is to a centermost pipe row of the turbulence generator.

A 22. The turbulence generator according of claim 20, wherein the flow cross-section areas of the turbulence pipes of one of the superimposed pipe rows are greater, the closer said pipe row is to a centermost pipe row of the turbulence generator.

23. The turbulence generator of claim 20, wherein the flow cross-section areas of the turbulence pipes of one of the superimposed pipe rows are greater, the closer said pipe row is to a centermost pipe row of the turbulence generator.

21-23 all same

Applicant: Sakari Soini  
PCT App. No.: PCT/FI00/00843

24. A paper machine headbox apparatus having a width, comprising:  
a first row of a plurality of turbulence pipes extending across the entire width of the headbox;  
a second row of turbulence pipes extending across the entire width of the headbox, and positioned below the first row;  
a third row of turbulence pipes extending across the entire width of the headbox, and below the second row, wherein each turbulence pipe is comprised of an initial section of a first cross-sectional area, and an end section downstream of the initial section, the initial section being connected to the end section at a stepwise expansion point, at which the cross-sectional area increases, and  
a slice duct positioned to receive stock suspension flow from the turbulence pipes and discharging through a slice opening to a web former, wherein the stock suspension flow is distributed into a plurality of layers by the rows of turbulence pipes, turbulence being generated in different layers of the flow in different phases of the flow by the stepwise expansion points, the spacing of the stepwise expansion points from the slice opening being different depending on the row in which a particular turbulence pipe is located, such that at the slice opening, a different turbulence prevails in different layers of the stock suspension flow.

25. The paper machine headbox apparatus of claim 24 further comprising a plurality of trailing elements, each trailing element starting from between two turbulence pipe rows and extending towards the slice duct of the headbox, each trailing element having a tip at its downstream end; and the distance of the tips of the trailing elements from the slice opening of the headbox is not the same for all trailing elements.

Applicant: Sakari Soini  
PCT App. No.: PCT/FI00/00843

26. The turbulence generator of claim 24, wherein the second row of turbulence pipes is the centermost row, and wherein the expansion spots of the turbulence pipes within a row are positioned closer to the slice opening of the headbox, the closer said pipe row is to the centermost pipe row.

27. The turbulence generator of claim 24, wherein the third row of turbulence pipes is a lowermost row, and wherein the expansion spots in a row are closer to the slice opening of the headbox, the farther said pipe row is from the lowermost pipe row of the turbulence generator.

Applicant: Sakari Soini  
PCT App. No.: PCT/FI00/00843

28. A paper machine headbox apparatus comprising:  
a first row of turbulence pipes;  
a second row of turbulence pipes below the first row;  
a third row of turbulence pipes below the second row, wherein each turbulence pipe is comprised of an initial section of a first cross-sectional area, and an end section downstream of the initial section, the initial section being connected to the end section at a stepwise expansion point, at which the cross-sectional area increases;  
a plurality of trailing elements, each trailing element starting from between two turbulence pipe rows and extending towards the slice duct of the headbox, each trailing element having a tip at its downstream end, and the distance of the tips of the trailing elements from the slice opening of the headbox is not the same for all trailing elements; and  
a slice duct positioned to receive stock suspension flow from the turbulence pipes and discharging through a slice opening to a web former, wherein the stock suspension flow is distributed into a plurality of layers by the rows of turbulence pipes, turbulence being generated in different layers of the flow in different phases of the flow by the stepwise expansion points and the trailing elements, such that at the slice opening, a different turbulence prevails in different layers of the stock suspension flow.

29. The turbulence generator of claim 28, wherein the second row of turbulence pipes is the centermost row, and wherein the cross-sectional areas after the stepwise expansion points of the turbulence pipes of the first row and the third row are less than the cross-sectional areas after the stepwise expansion points of the centermost row.